Fiberassign performance

Jaime E. Forero-Romero *
Universidad de los Andes

November 16, 2018

Abstract

In this document I use DR7 data to show that fiberassign meets the desired performance in terms of total fiber usage and number of calibration targets.

1 Introduction

`f`iberassign is the software that computes the assignment of fibers to DESI targets.

The following are the minimal requirements on its performance

- Fiber assignment uses required fraction of fibers IN.DAT-7002
- Fiber assignment provides sufficient calibration fibers IN.DAT-7003

In this document I present the results of running `f`iberassign on targets from DR7 to demonstrate how the two requirements mentioned above are met. Furthermore I list some computational performance results to understand how long does it take to run the code and how many resources does it use.

2 Software and input data

For this report I use tag `0.10.1` of `f`iberassign.

The input targetting data comes from DR7. On NERSC the files can be found here: `/project/projectdirs/desi/target/catalogs/dr7.1/PR372/`

The targeting files need to be prepared in order to pass them to fiberassign. The code that prepares the data and runs fiberassign can be found here: `https://github.com/forero/fiberassign_explore/blob/master/py/fiberassign_on_DR7.py`. The script needs to be executed as `python fiberassign_on_DR7.py --program dark --size large` to produce the outputs analized in this report.

The most important features to highlight about fiberassign are the following:

*`j.e.forero.romero@gmail.com`

- It receives as input three files: a list of science targets, a list of good sky locations and a list of standard stars.
- The code fills up to 400 sky fibers and 100 std fibers if the number density of those calibration targets is high enough.
- Afterwards the code proceeds to assign science targets.
- If there are unused fibers after the science assignment process those fibers are filled with sky targets if available.
- There are also BADSKY locations that are treated as another science target with the lowest priority.

We only use targets that can be observed in dark time. With this restriction we end up with 7054 DESI tiles that correspond to dark time and overlap with the DR7.1 footprint. This selection returns 36M targets, 1.3M standard stars and 22M sky locations. Furthermore, we restrict our analysis on tiles that have complete imaging within 128 <RA< 225 and -7 <dec< 32. This selection reduces the total number of tiles to 2510.

3 Results

Figure **??** summarizes the results, it shows the histograms of the number of used SKY and STD fibers per wedge for all tiles. The label shows the average and the standard deviation computed over the tiles.

These histograms show that all wedges in all tiles use at least 40 SKY fibers and at 10 STD fibers. There is only one wedge in one tile that uses 9 STD fibers.

Figure 2 shows the histograms of the number of used fibers per tile. The label shows the average and the standard deviation computed over the tiles.

These histograms show that all tiles use at least 4996 fibers; on average 99.98% of the fibers are used. 1817 tiles out of the 2510 (72%) use all 5000 fibers. All tiles have at least 400 SKY locations and all tiles have 100 STD fibers, except one with 99 STD fibers.

4 Performance

Runnig fiberassign on a cori login node takes 2 hours and uses a peak of 38GB of RAM. The wallclock time is proportional to the number of tiles. In this case we have that the code assigns on average one tile per second.

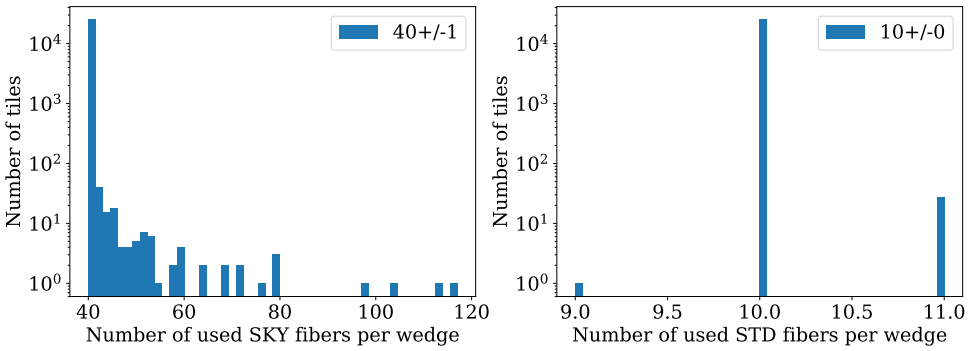

Figure 1: Histograms for the numbers of used SKY and STD fibers per wedge.

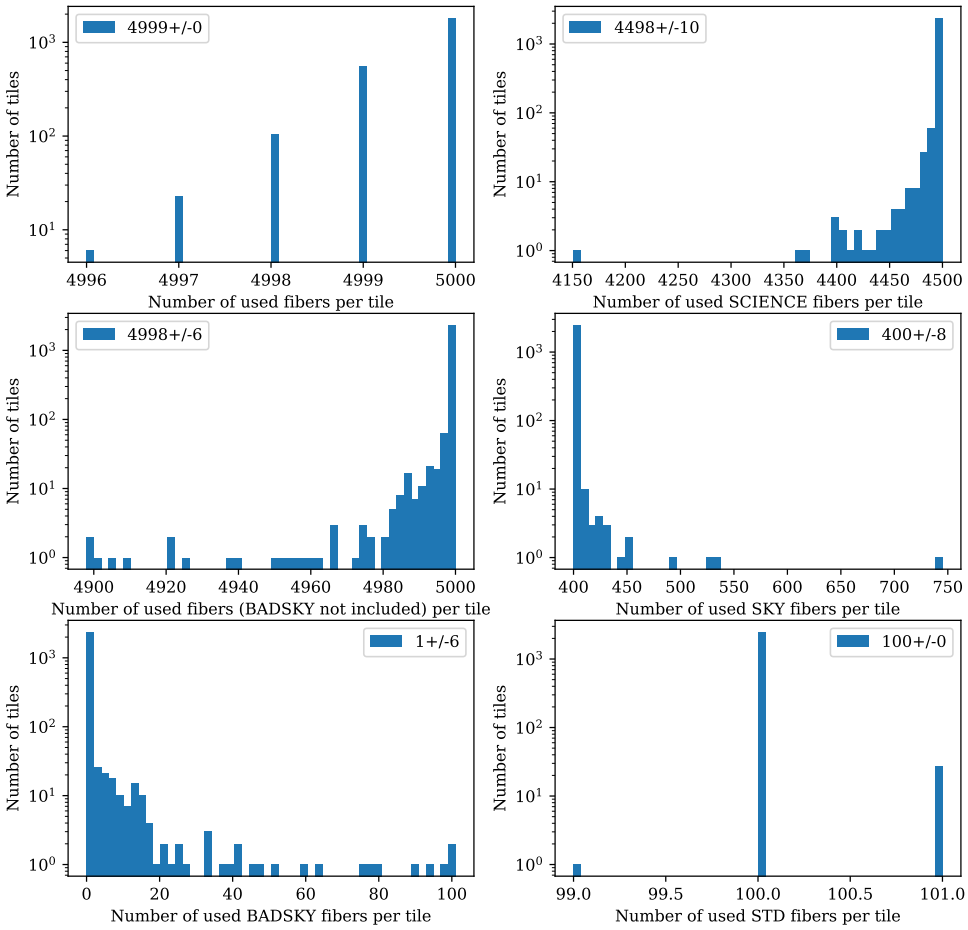

Figure 2: Histograms for the numbers of used fibers per tile. There are six different sets: all used fibers, SCIENCE fibers, all fibers without BADSKY, SKY fibers, BADSKY fibers and STD fibers.